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Telling one story, or many? An ecolinguistic analysis of climate change stories in UK national newspaper editorials

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ABSTRACT

Media reporting of climate change plays a key role in shaping public perceptions and influencing climate policy. Scholarly debates about the representation of climate change in the mass media have largely concentrated on journalistic norms, expertise and ideology, on the role of imagery or on narrow aspects of language use. This study takes a different approach by focusing on how the *story* of climate change is told in the UK through mainstream newspaper editorials. Four climate change stories that have shaped the UK's national conversation on climate change are identified as Lukewarmer, Ecoactivist, Smart Growth Reformer and Ecomodernist. The narrative representation of climate change of these four stories as captured in the editorials of five UK national newspapers in 2001, 2007 and 2015 is then analysed using a multi-faceted ecolinguistic framework. Our analysis shows that the partisan divide on climate change between politically 'left' and 'right' broadsheets is much less in 2015 when compared with 2001. It identifies the salience of the Ecomodernist story across a broad political spectrum of print media in 2015. The Ecomodernist story emphasises technology and energy innovation responses to climate change, whilst also recognising that adaptation to extreme weather events is necessary. These two story-elements are present across different climate change stories, thus highlighting investment in climate adaptation and in energy R&D as responses to climate change that are less exposed to ideological contention.

1. Introduction

A growing awareness of the media's influence on societal attitudes toward climate change has resulted in increasing scholarly interest in the interconnections between climate change and the media. This includes the media construction of climate change through journalistic norms (Boykoff and Boykoff, 2007; Brüggemann and Engesser, 2017; Kunelius, 2019), the political actors involved in framing climate change risks (Carvalho, 2005), the political alignment of journalists (Elsasser and Dunlap, 2012), the differing levels of journalists' expertise in climate change issues (Brüggemann and Engesser, 2014), the contrast between legacy and new social media in framing climate change (Painter et al., 2018) and the ways in which climate change communication is emotionally anchored (Höijer, 2010). The global reach of climate change has also led researchers to investigate the cognitive frames used by journalists in different countries (Engesser and Bruggemann, 2015), the media discourses of climate and international development (Doulton and Brown, 2009), and the media coverage across multiple nations (Schmidt et al., 2013; Schäfer et al., 2016).

Over the last three decades, media coverage of climate change has produced a number of distinct discourses that have evolved from particular ideologies, convictions and evaluations of climate change. 'Discourse' is a multi-faceted and flexible concept. In this paper we ground our understanding of discourse in the theory of Michel Foucault, one that can be defined as "ideas, concepts and categories through which meaning is given to social and physical phenomena" (Hajer and Versteeg, 2005:175). Discourse can also be broadened to embrace social action (Sharp and Richardson, 2001). Thus environmentalism can been seen comprising a variety of discourses, sometimes complementing but often competing with each other for attention and political ascendancy (Dryzek, 2013). These discourses offer "shared ways of apprehending the world" (Dryzek, 2013:9) and require actors or agents that can be "individual or collectivities" (Dryzek, 2013:18)). Collectivities such as non-governmental organisations, social movements, environmental campaign groups, government departments, think tanks and energy companies all exert influence on forming climate change discourses, but so too do individual actors. For example, due to the complex nature of climate change as a socionatural phenomenon many people look to individual actors, which include public intellectuals, to form opinions on the issue (Nisbet, 2014). Many public intellectuals belong to, and are

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crucial to the foundation of, social movements (Corcoran and Lalor, 2012) and "it is this sense of movement that they embody," (Borg and Mayo, 2007:xi). Public intellectuals, who are often distinguished academics, writers, journalists, or politicians, are an important part of shaping discourse on climate change in the mass media because they structure and articulate groups of shared worldviews which can significantly impact public policy (Etzioni, 2006).

The research described in this article is based on the premise that climate change stories, presented by the media, influence how people think and act in response to global warming (Weingart et al., 2000; Wilson, 2000; Corbett and Durfee, 2004; Dittmer, 2005; Hart, 2011). Detailed discussion and analysis of climate change stories not only has the potential to expose ideas that are a hindrance to effectively tackling climate change; it also opens up the possibility of creating new, more constructive stories that could lead humankind down a path to a more sustainable future (Doyle, 2011; Eisenstein, 2013; Stibbe, 2015; Evans, 2017). Although it is recognised that there is not just one story to tell nor one single imperative to act on climate change (Hulme, 2015), it is also acknowledged that: "To change the human future, we must change our defining stories" (Korten, 2006:16).

In the study described here, we define and analyse the climate change stories reported in UK newspaper editorials in three years, namely 2001, 2007 and 2015. These years were chosen because they contain significant events in climate change history. The Third Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) was published in 2001, revealing the 'hockey stick' data showing the recent sharp rise in globally-averaged surface temperature relative to the last millennium (IPCC, 2001). The United Nations Climate Change Conference (COP 21) in Paris was held at the end of 2015. 2007 was chosen as a significant snapshot year for the UK because it was the year after the influential Stern report (Stern, 2006) was released and the year before the UK Climate Change Act 2008 was passed into law.

We examine the changing prevalence of four climate change stories as they appear in the editorials of five national UK newspapers: The Guardian, The Independent, The Times, The Daily Telegraph and The Daily Mail. Expanding on Matthew Nisbet's work (2014), which identified three main stories in the climate change debate in the Anglophone world, we identify a fourth story, which also has a strong presence in the national conversation on climate change within the UK.

The conceptual framework used to analyse the four distinct climate change stories is based on the ecolinguistic approach outlined by Stibbe (2015), which integrates ecolinguistics with Critical Discourse Analysis (CDA) in assessing the relationship between humans and their environment through language. CDA relies on the premise that the way people construct meaning, interpret, discuss and analyse environmental issues has far-reaching consequences for human action in the world (Dryzek, 2013). Building on Stibbe's approach, we developed an original multi-faceted ecolinguistic framework capable of identifying both overarching narrative themes and detailed aspects of climate change stories and applied it to the editorials in the British national press. Both CDA and ecolinguistics share the same critical perspective towards the impact of language in constructing meaning, ideologies and worldviews, with CDA focused more on social issues and eco-linguistics on environmental issues. The theoretical framework developed and used in this study acknowledges that both social processes and environmental issues are relevant to the investigation of climate change stories (Nerlich and Koteyko, 2009: Sedlaczek, 2016).

This "ecolinguistically-orientated CDA" analysis of media texts differs from previous research assessing the use of language in climate change communication because it includes a wide range of cognitive science and linguistic theories. Previous studies have had a narrower focus: concentrating, for example, on linguistic repertoires (IPPR, 2006; IPPR, 2007), the use of metaphor (Nerlich and Koteyko, 2010; Koteyko, 2012; Atanasova and Koteyko, 2015), ideology (Carvalho, 2007) or the theory of language in communication (Nerlich et al., 2010; Fløttum, 2017).

The questions addressed by the study reported here are: (1) What are some of the main climate change stories present in the national conversation on climate change within the UK? (2) How have these different stories been construed and promoted by mainstream newspapers? (3) How might external events have influenced any changes in their salience? Methodologically, we are also interested in evaluating how effective is the "ecolinguistically-orientated CDA" framework in revealing the nuanced arguments of different climate change stories and identifying common ground between seemingly entrenched opposing positions.

2. Theoretical approach

Discourse analysis (DA) is widely used in environmental policy research and has the advantage of taking a critical stance towards "truth", emphasising the communications through which knowledge is exchanged (Sharp and Richardson, 2001; Hajer and Versteeg, 2005). Critical discourse analysis (CDA), an extension of DA, focuses on text and linguistic features of language which can signal their own meaning as well as the relation between discourse and particular social, political and cultural contexts (Carvalho 2007) Ecolinguistics is an emerging sub-discipline within the social sciences and was the chosen approach for this research, because it is a form of CDA that links the study of language specifically with ecology (Fill, 1996). CDA looks mainly at words and syntax of discourse and has typically focused on social constructs of power relations within a society (Fairclough, 2013). In contrast, Ecolinguistics explores the whole language system (Fill and Muhlhausler, 2001; Steffensen and Fill, 2014). It seeks to recognise the connections between environmental problems and social processes, together with the impact of environmental degradation on people now and in the future as well as on non-human life (Sedlaczek, 2016). Although ecolinguistics is interpreted by scholars in different ways, its fundamental premise is that because "human culture is connected to the physical world, affecting it and affected by it" our worldviews and actions concerning the natural world are shaped by language (Glofelty, 1996:xix; Lakoff & Johnson, 2003). The four different interpretations of ecology, as identified by Steffensen and Fill (2014:7), lie behind the different understanding of ecolinguisitics. The ecolinguistic framework in this paper is concerned both with "natural ecology", the relationship of language with its physical and biological environment (Stibbe 2015), and "human ecology", the interactions humans have with each other, other organisms and the physical environment that are vital for the continuation of life (Gare, 2002) In short, the language we use can inspire us to destroy or protect the world that sustains us.

Our research draws on Stibbe's interpretation of ecolinguistics as a means of "questioning the stories that underpin our current unsustainable civilisation" (Stibbe, 2014:117). We have adapted Stibbe's approach that builds on a wide range of linguistic and cognitive tools, detailed in Table 1, to form our "ecolinguistic framework", yet we have not sought to judge these stories according to a particular ecological philosophy "ecosophy" (Stibbe 2015:10). The "ecolinguistic framework" includes the following elements:

- "Critical Discourse Analysis" (CDA) based on the assumption that language is an irreducible part of social life (Fairclough, 2003:2);
- frame theory (Lakoff and Wehling, 2012) where 'framing' may be defined as a way of emphasising certain aspects of a complex issue, to appeal to people with differing worldviews (Nisbet and Scheufele, 2009);
- metaphor theory where comparisons are made between two unrelated things (Muller, 2008);
- appraisal theory which identifies language used for implying positive and negative connotations (Martin and White, 2005);
- identity theory where identity impacts on environmental behaviour (Benwell and Stokoe, 2006);
- fact construction which examines how factual information is

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Table 1
Outline of the Ecolinguistic framework (adapted from Stibbe 2015:17).

Tools	What it is	What to look for
Ideology	A story about how the world was, is and should be in the minds of members of a group	Discourses i.e. characteristic language features used by members of a group
Framing	The use of a source frame to structure a target domain	Trigger words that bring a particular source frame to mind
Metaphor	A type of framing where the source frame is from an imaginable area of life that is distinctly different from the target domain	Trigger words that bring the source frame to mind
Evaluation	A story in people's minds about whether an area of life is good or bad	Appraisal patterns i.e. patterns of language, which represent things positively or negatively
Identity	A story in people's minds about what it means to a particular kind of person	Forms of language that characterise people
Conviction	A story in people's minds about whether a particular description if true, certain, uncertain or false	Facticity patterns i.e. linguistic patterns that represent a description as true, uncertain or false
Erasure	A story in people's mind that something is unimportant or unworthy of consideration	Patterns of language which erase or diminish
Salience	A story that something is important or worthy of consideration	Patterns of language which foreground an area of life

described to promote action (Potter, 1996);
- and theories of erasure which examine those areas of life that are suppressed, excluded or ignored in texts (van Leeuwen, 2008).

3. Role of the media

The continued agenda setting power of UK national newspapers is validated by the National Readership Survey (NRS) which shows that 90% of British adults, 15 and over, consume a daily news-brand across print and digital (NRS, 2015). Polling data shows that 78% of people in Britain say they are well informed about climate change and identified their main source as online newspapers (Ipsos, 2014).

This analysis focuses on climate change-related opinion in the editorials of four UK national newspapers which each possess a net monthly readership across print *and* digital of over 10 million (Turvill, 2015). A fifth newspaper, The Times, is also included, despite a lower readership of 4.9 m because of its perceived "agenda-setting" power (Carvalho and Burgess, 2005:1460; Sparks, 1987). Our analysis therefore focuses on The Daily Mail, (monthly readership: 23.5 m), The Telegraph (16.4 m), The Guardian (16.3 m), The Independent (10.4 m) and The Times (4.9 m). The newspapers chosen span the political spectrum. The Daily Mail, The Telegraph and The Times are right of centre newspapers and perceived as more sceptical of climate change, notably the Daily Mail (Atanasova and Koteyko, 2015; Woods et al., 2012). The Guardian and the Independent are left of centre and perceived as supportive of mainstream scientific views on climate change (Carvalho, 2007; Atanasova and Koteyko, 2015).

This study is unique because it concentrates on editorial texts only. Most previous research has combined editorials with op-ed articles, by-lined opinion pieces that are written by either the newspaper's team of columnists or outside authors, or focussed on news articles (Atanasova and Koteyko, 2015; Nerlich and Koteyko, 2010; Boykoff, 2008). Editorials have a special significance within news media, as they are written in consultation with editors and colleagues within the newspaper and reflect the position taken by the editorial board. They are free from the objective constraints of news discourse and are written to distil current thinking on complex issues in order to convince the reader, making them one of the best examples of persuasive writing (Connor, 1996). Editorials are effectively conversations among society's elite influencing economic and political decisions made (Henry and Tator, 2002). They are never neutral and are often written from particular ideological stances of the editors or the newspapers proprietor (Vestergaard, 2000; Hulme et al., 2018).

4. Methodology

Nisbet's (2014) research on public intellectuals and climate change, drawn primarily from the UK and US, identified three stories supported by groups of public intellectuals on climate change: Ecoactivist, Smart Growth Reformer and Ecomodernist. These three groups all accept the human causes of climate change. To encompass a larger part of the UK conversation on climate change we sought to encompass those who are not convinced either that climate change is happening or that it is a problem. By reviewing organisations in the UK focussed on climate change including lobby groups, think-tanks (e.g. The Global Warming Policy Foundation; the Institute of Economic Affairs), NGOs and identifying key figures within those organisations that have written extensively on climate change (e.g. Matt Ridley, Philip Stott), we identified a fourth narrative attempting to influence the national conversation, one that self-identified as Lukewarmer (Ridley, 2015). Although these four climate change stories form the basis of our research, it is acknowledged that other narratives may exist and throughout the analysis of the newspaper editorials care was taken to note any themes or ideas that were not part of these four climate change stories.

Each climate change story was analysed using the ecolinguistic framework outlined in Table 1 and assigned codes. Using this coding table of 57 codes (cf. Appendix A) an ecolinguistic text-analysis framework was developed using NVIVO, a computer-aided qualitative data analysis software package to analyse the editorial texts. This novel framework was then applied to the editorial content across our five selected British national newspapers in 2001, 2007 and 2015.

In the LexisNexis database, a Boolean query of 'climate change' OR 'global warming' OR 'greenhouse effect' was applied to all years from 2000 to 2015. An initial search of climate change stories showed that media coverage rose from 1551 articles in 2001 to 9886 articles in 2015 (Fig. 1).

For practical reasons it was necessary to select a beginning and end year for analysis with a snapshot year in between. The calendar years chosen, 2001, 2007 and 2015 were identified as major years for climate change events, since such events trigger more media coverage (Legagneux et al., 2018).

Of the initial corpus of 20,097 articles on climate change in the three selected years, we identified 1371 as 'Editorial or Comment' using Nexis search tools. These were read manually, by-lined op-eds were eliminated and only staff editorials whose *main* focus was climate change were included. For all newspapers, except The Independent, all editorials that focussed on climate change were included. For just this title, and only in 2007, a date sampling of one in three was instigated to bring the number of The Independent editorials to the same order as the other national newspapers. This resulted in a final overall sample of 173 editorials being coded (Fig. 2). In many cases editorials were assigned more than one code, as they incorporated themes that either were common for at least two of the four climate change stories or incorporated different aspects of the four climate change positions. To test coding reliability, a random c.10% sample (18 articles) was given to an external researcher. The level of agreement using all the available codes listed in Table A1 was found to be excellent, generating a Kappa value of 0.906, which shows an approximately 91% agreement.

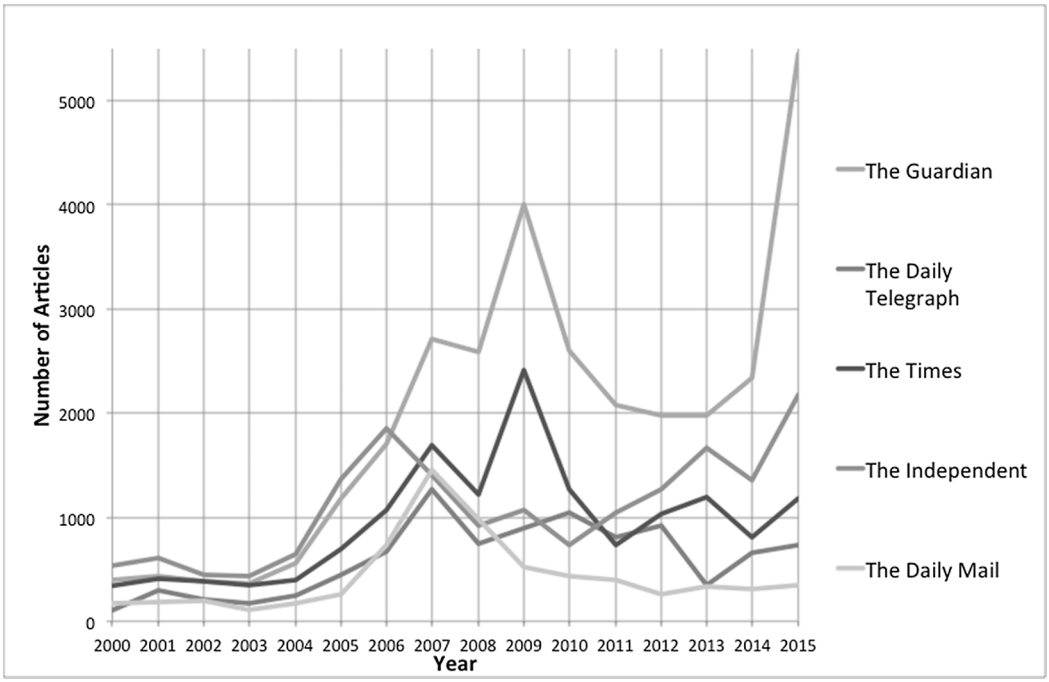


Fig. 1. Frequency of all "climate change" articles in five selected national newspapers: 2000–2015.

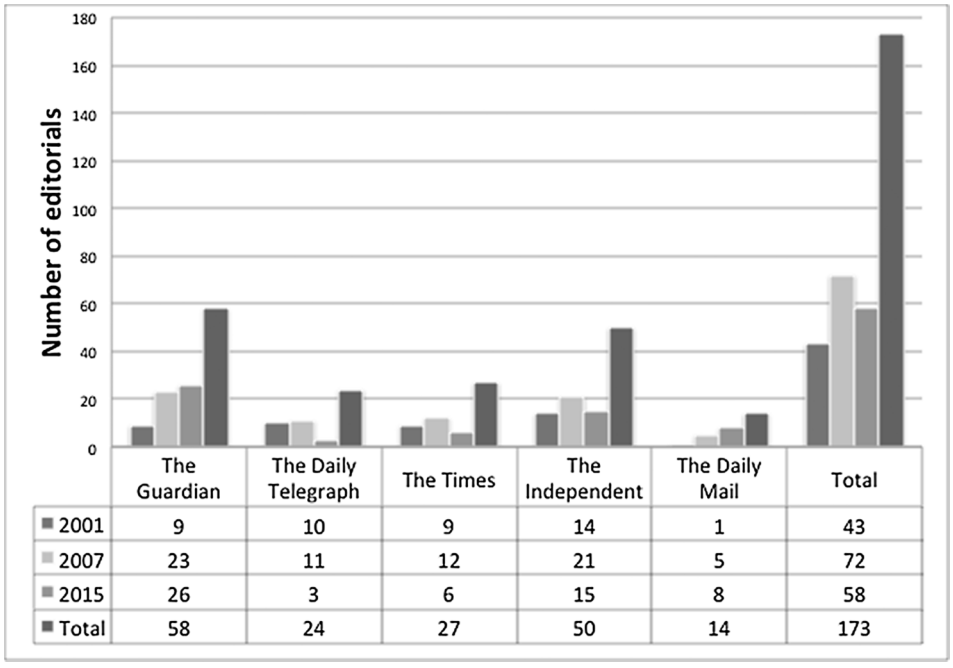
5. Results

In presenting our results we first give a descriptive account of each of the four climate change stories, and highlight particular public intellectuals who are associated with them, before then showing and explaining the changing prevalence of each story in the selected newspaper editorials.

5.1. Climate change stories

5.1.1. Lukewarmer story

The Lukewarmer story accepts that climate change is real and mostly man-made, but does not consider it to be a planetary emergency. It is optimistic that human ingenuity and prosperity will enable successful adaptation and that life for humankind will continue to improve (Lawson, 2008, 2014; Ridley, 2015). The Lukewarmer position maintains that there is no consensus about the science of anthropogenic warming and that climate models are unreliable and yield exaggerated



	The Guardian	The Daily Telegraph	The Times	The Independent	The Daily Mail	Total
2001	9	10	9	14	1	43
2007	23	11	12	21	5	72
2015	26	3	6	15	8	58
Total	58	24	27	50	14	173

Fig. 2. Frequency of "climate change" editorials analysed in our five selected national newspapers in three selected years: 2001, 2007, 2015. *(*1 in 3 sampling carried out for The Independent 2007 – total editorials published in The Independent, 92).*

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predictions (Monckton, 2014; Ridley, 2015).

This story rejects the framing of climate change as a 'problem', instead arguing that increased carbon dioxide levels in the atmosphere are beneficial to "the biosphere and humanity by stimulating plant life, warming the planet and increasing rainfall" (Ridley, 2010; Goklany, 2015:xi). It contends that the IPCC process is flawed due to ideologically motivated scientists using evidence selectively and relying on flawed models. Furthermore, it depicts international agreements and mitigation as economically and scientifically futile (Adams, 2015), with unintended environmentally damaging consequences (Montford, 2015). Religious metaphors portraying climate change as a 'secular religion' are favoured (Nerlich, 2010). Terms such as crusaders, evangelists and fanatics are used to downplay the urgency to act on climate change (Atanasova and Koteyko, 2015).

Advocates of this position – "Lukewarmers" – evaluate global warming as overall benefiting the world (Lomborg, 2013), claiming it has saved mankind from another ice-age (Ridley, 2015). They argue that improved flood defences, plant breeding and better infrastructure, will address any problems that arise (Lawson, 2008). Renewable energy is not considered suitable to meet growing energy requirements when compared with nuclear and fossil fuels (Montford, 2015; Hoffman, 2011). They have a libertarian and anti-regulation mind-set (Howarth and Sharman, 2015). The tenets of Lukewarmers are that; climate change is not a catastrophe, investment is needed in adaptation not mitigation, and economic growth is necessary to ensure prosperity.

Those such as Matt Ridley, a journalist and member of the academic advisory board for Global Warming Policy Foundation (GWPF), self-identify as Lukewarmers (Ridley, 2015). Other prominent Lukewarmers evident in UK public media include: Nigel Lawson, politician, and founder of GWPF; Andrew Montford, a writer and founder of Bishop Hill, a climate sceptic blog; and the economist Bjørn Lomborg. The Lukewarmer climate change story is outlined in Table 2 along with the codes we assigned it for analysis.

5.1.2. Ecoactivist story

The Ecoactivist story contends that through excessive consumerism and population growth humans are reaching the limit of the world's resources and destroying the natural world upon which they depend (Ehrlich, 1968; Meadows et al., 1972). It is a pessimistic story of impending doom, ecological destruction and, for some, the end of humanity, unless radical action is taken to curb human demands on the Earth's ecosystems (Monbiot, 2006; Kingsnorth and Hine, 2009; Rockström et al., 2009; Dryzek, 2013; Klein, 2014). Overall it is sceptical of technological fixes, such as carbon capture, geo-engineering, genetically modified food, fracking and nuclear power, branding them either too expensive or too risky (Hamilton, 2010). Ecoactivist advocacy is one of radical societal change, with a move away from perpetual economic growth and dependency on fossil fuels (Schumacher, 2010; Suzuki, 2010) towards alternative futures (Anderson and Bows, 2012).

A dominant frame of the Ecoactivist story is 'imminent catastrophe': environmental degradation, health and security risks caused by droughts, instability and mass migration (IPPR, 2006; Kingsnorth and Hine, 2009). Other frames are based on capitalism and consumerism exceeding the carrying capacity of the planet and a need to reorganise human societies (Klein, 2014; Randers, 2012). One frame calls for limits on consumption and lifestyles choices, including implementing renewable energy sources and rationing (Anderson, 2012b). Another highlights deprioritising economic growth and finding new indicators to define progress (Naess, 1990; Daly, 1997; Jackson, 2009; Schumacher, 2010).

The Ecoactivist story conceptualises responding to climate change as a war to be won, employing metaphors of battle, fight, surrender and triumph (Atanasova and Koteyko, 2015), or as an apocalyptic vision with threats and tipping points (Dryzek, 2013; Steffen et al., 2018). Other metaphors, such as "Mother Earth" (Nerlich and Jaspal, 2012), focus on humanity's embeddedness in the natural world. The 'good life' is one of small-scale economy, locally-owned renewable energy, minimum consumption and decoupling prosperity from growth (McKibben, 2007; Jackson, 2009). International agreements are good, but are not enough to deal with the scale of the problem (Nisbet, 2014).

Those that support this story – "Ecoactivists" – tend to be anti-capitalist, focussing on local community and fostering harmony with nature. They are convinced that anthropogenic climate change is real and action is required. They trust scientific knowledge produced by the IPCC; if anything it 'errs on the side of least drama' (Brysse et al., 2013). For Ecoactivists, nature and wilderness are Eden-like places, which are fragile and in need of protection (McKibben, 1989). One of the issues with "norms of frugality and simplicity" (Karlsson, 2015:1) promoted by Ecoactivists is that it ignores people's aspirations for a 'better life' such as flying abroad for holidays, travelling by car and unlimited access to energy. The Ecoactivist climate change story is outlined in Table 3 along with the assigned codes.

Key public intellectuals evident in UK public media who write and

Table 2
Ecolinguistic analysis of Lukewarmer climate change story with assigned codes.

Ecolinguistic Framework	Description	Code
Stories-we-live-by	Climate change is real and mostly man-made but is not a planetary emergency. The effects of global warming are marginal and overall beneficial	
Ideology	Climate change is not dangerous but slow and erratic. Climate science predictions, impacts and causes are debatable: there is no consensus and the models are unreliable and exaggerated	LWIS
	Prosperity and adaptation: Mitigation is a mistake as it is harmful and expensive. Individuals should not have limitations place on their consumption or lifestyle choices. The richer we are the more able we will be to deal with global warming, i.e. prosperity is key	LWIA
Framing	Nature and agriculture benefit from higher levels of carbon dioxide because of increased fertilisation effects	LWF1
	The IPCC process for determining scientific evidence is flawed. Scientists are ideologically motivated and use evidence selectively. There is no consensus. Scientists are economically motivated to get more grant money for their research	LWF2
	Mitigation is futile: the economics do not add up. International agreement pointless. Adaptation is the way forward. Developing countries like China and India need to cut emissions. The developed world alone will have no impact, so international agreements are pointless	LWF3
Metaphor	Religious metaphors: crusaders, zealots, evangelists. fanatics. Secular religion	LWM
Evaluation	Good: Global warming is good: it benefits the world. Adaptation is good: it leads to better flood defences, plant breeding and infrastructure. Adaptation does not require international treaties and can be applied locally and unilaterally. Nuclear energy is good	LWEG
	Bad: Mitigation strategies are bad. They are ineffective, expensive and harmful. Renewables are bad: they are not a viable energy option and are a waste of money	LWEB
Identity	Libertarian. Anti-regulation, non-interventionist	
Conviction	Climate change is real but does not need to be mitigated	LWC1
	Investment needed in adaptation	LWC2
	Economic growth is necessary	LWC3
Erasure	Increasing carbon dioxide levels are unimportant: not related to rising sea levels, droughts or extreme weather events	LWE
Salience	Life for humans will continue to improve: we will all be better off in the future	LWS

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Table 3
Ecolinguistic breakdown of Ecoactivist climate change story with assigned codes.

Ecolinguistic framework	Description	Code
Stories-we-live-by	Humans, through population growth and consumerism are reaching the limit of the world's resources and destroying the very world they depend on. Pessimistic narrative that warns of impending doom, ecological destruction and the end of humanity unless radical action is taken	
Ideology	Humanity is destroying the Earth	EAIC
	Limits of Economic Growth: Human societies need to be fundamentally reorganised away from the capitalist norm that "growth is good"	EAIG
Framing	Imminent catastrophe: Climate change increases health, security and environmental risks including hurricanes, droughts, biodiversity loss, disease, instability and mass migration	EAF1
	Limits on consumption and lifestyle choices are needed to protect the earth for future generations. Investing in renewables is good for the economy	EAF2
	Deprioritise economic growth. New economic model required, with new indicators for progress such as well-being	EAF3
Metaphors	War metaphors: battle, fight, retreat, combat	EAM
	Apocalyptic: tipping point, overshoot and collapse, climate clock ticking. Embedded humanity: Planet Earth, Mother Earth, Saving the Seed	
Evaluation	Good: Limiting consumption, lifestyle and carbon footprint; Small scale, locally owned renewables, solar, wind, geothermal. Regulation and international agreements	EAEG
	Bad: Industrialisation and capitalism; technological fixes such as carbon capture; genetically modified foods and geo-engineering; nuclear energy, fossil fuels and fracking	EAEB
Identity	Anti-capitalist, anti-globalisation, local community, harmony with nature	
Conviction	Climate change is real and needs to be tackled. Emphasis on the scientific certainty of evidence	EAC1
	Nuclear energy and geo-engineering too risky and too costly	EAC2
	Continual economic growth is false: breeds dissatisfaction and will lead to planetary catastrophe	EAC3
Erasure	People's aspirations for flying abroad for holidays, driving cars, having unlimited energy are unworthy of consideration as they need to understand these things will not make them happy and sacrifices need to be made	EAE
Salience	Nature and Wilderness are fragile, sacred and need to be protected	EAS

campaign in the Ecoactivist tradition are Bill McKibben, environmentalist, George Monbiot, journalist and activist (who is unusual among Ecoactivists in being pro-nuclear energy), Tim Jackson, Professor of Sustainable Development at the University of Surrey, Naomi Klein, writer and social activist, and Caroline Lucas, politician and co-leader of the Green Party.

5.1.3. Smart growth reformer story

While the Smart Growth Reformer story concurs with the Ecoactivist position that the impact of humankind on the Earth's ecosystems needs to be curtailed, it promotes the idea that intelligent use of market mechanisms is the most effective way of creating a low-carbon economy and preventing "dangerous anthropogenic interference" (Boykoff et al., 2010:54; Paterson, 2011; Grubb, 2012). A central tenet to this story is that sustainable economic growth is possible and current lifestyles can be maintained (Friedman, 2009). It contends that with appropriate market regulation, climate change becomes a business opportunity (Gore, 2006; Fallows, 2015).

One of the three main framings of climate change in the Smart Growth Reformer story is 'climate change is an economic problem' (Stern, 2006). A high price on carbon is seen as capable of launching a 'global energy revolution' (Rockström and Klum, 2015:165). Another framing is 'Natural Capital', where ecosystem services are assigned an economic value to encourage sustainable development (Hawken et al., 1997; Tallis et al., 2008; Kareiva et al., 2011; Sachs, 2015). A third frame is 'climate change is a business opportunity' and "one of the greatest wealth-generating opportunities of our generation" (Branson, 2015:1).

Metaphors used are associated with carbon output: "Carbon Footprint" (Nerlich and Hellsten, 2014), carbon sinks and green growth (Shaw and Nerlich, 2015). The goal of a carbon neutral society has led to metaphors of "clean energy revolution" (Branson, 2015:1) and "Code Green" (Friedman, 2009:219). It acknowledges that carbon taxes will lead to a 'soft energy' revolution of renewables (Lovins, 1976), but holds, like the Lukewarmer and Ecomodernist story, that renewables are not capable on their own of fulfilling modern society's energy requirements (Sachs, 2008; Friedman, 2009; Stern, 2009). It concurs that international agreement on tackling climate change is necessary and that government needs to foster innovation in developing safer nuclear energy and alternative energy sources (Nisbet, 2014).

Those that support the Smart Growth Reformer position – "Smart Growth Reformers" – identify with a strong belief in the power of the capitalist economy and see themselves as "sober optimists" (Friedman, 2009:472). They have a firm conviction that climate change is real and needs to be tackled. They believe that economic expansion is desirable and that private investment and public-private partnerships are vital to achieve this (Hoffman, 2006; Benioff and Bezos, 2015). They contend that a carbon neutral society is achievable by 2050 and emphasise that the world needs widely available energy that is reliable, affordable and does not produce carbon (Deben and Krebbs, 2015).

A point of erasure for Smart Growth Reformers is their ignoring claims about the finite nature of the planet. For example, the "irreversible and non-substitutable damage to and loss of natural capital" (Neumayer, 2007:297) is highlighted by research showing demand for ecosystem services now outweighs supply in most areas (Scholes, 2016). The cultural importance of nature is also in danger of being ignored by Smart Growth Reformers in their reduction of nature to a monetary commodity (Chee, 2004). Smart Growth Reformers think the welfare of future generations relative to our own is important (Stern, 2006).

Key public intellectuals evident in UK public media who endorse the Smart Growth Reformer position include: Al Gore, politician and author of *An Inconvenient Truth*; Nicholas Stern, economist and chair of the Grantham Research Institute on Climate Change and the Environment, Johann Rockström, executive director of the Stockholm Resilience Centre and Richard Branson, business entrepreneur. The Smart Growth Reformer climate change story is outlined in Table 4 along with assigned codes.

5.1.4. Ecomodernist story

The Ecomodernist story concurs with the Ecoactivist position that "humanity must shrink its impact on the environment to make more room for nature" (Nordhaus and Shellenberger, 2015:6). But instead of harmonisation with nature, it contends that human activities need to be locationally decoupled from nature to avoid economic and ecological collapse. It is a morally progressive, optimistic and pragmatic position that relies on technological innovations and modernisation to mitigate climate change problems at the same time as reducing poverty and sparing nature. The Ecomodernist, approach is that climate change is a 'wicked' problem that is incapable of being 'solved' (Hulme, 2009:334). It holds that climate change action should focus on developing low-carbon emissions energy technologies and societal resilience strategies to improve living standards, equality and human-rights world-wide (Nordhaus and Shellenberger, 2007; Prins et al., 2010).

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Table 4
Ecolinguistic analysis of Smart Growth Reformer climate change story with assigned codes.

Ecolinguistic Framework	Description	Code
Stories-we-live-by	Capitalism and market mechanisms are the most effective tools for instigating real and long-lasting change in human society. Optimistic that, with the right policies focussed on incentives and regulation, capitalism can deliver a low carbon/neutral carbon economy thus stabilising the climate and preventing catastrophic climate change	
Ideology	Economic Growth is imperative. Market regulation and intelligent economic frameworks can provide business opportunities along with sustainable development and growth to maintain current lifestyles	SGIE
	Nature as Natural Capital. Only way to save nature is to give it a monetary value which although would increase short term costs would save money in the long run	SGIN
Framing	Climate Change is an economic problem and a threat to the global economy: economic benefits of strong early action outweigh costs. Market regulation required with emissions quotas and taxation to achieve climate stabilisation	SGF1
	Nature has an economic value: monetary value needs to be assigned to ecosystem services	SGF2
	Climate change is a business opportunity. Business solutions are required to advance the low carbon economy, generating millions of jobs. Private-public partnerships are required to take innovations from universities to the market place	SGF3
Metaphors	Carbon sinks, green growth, greening of world markets, Code Green, clean energy revolution	SGM
Evaluation	Good: Emissions trading/carbon tax or cap will allow proliferation of renewables. Sustainable economic growth possible if the right policies are adopted. Financially profiting from climate change is good. International agreement necessary	SGEG
	Bad: Renewables alone are not enough for modern society. Other energy sources are required	SGEB
Identity	Economists, strong belief in market and imperative economic growth	
Conviction	Climate change is real and needs to be tackled. Emphasis on scientific certainty of evidence	SGC1
	Continual economic growth possible and desirable. Private investment needed	SGC2
	A Carbon neutral society is achievable by 2050. The world needs widely available energy that does not produce carbon. Nuclear power is needed. Government needs to foster innovation for other sources of energy	SGC3
Erasure	Ignores the limits on natural resources and the loss of natural capital. Ignores the social meanings and cultural importance of nature	SGE
Salience	The welfare of future generations relative to our own is important and should be taken into consideration	SGS

The anthropocentric position of the Ecomodernist story gives humans a special status with responsibilities to the non-human world (Lynas, 2015a). Optimistic about the human potential for innovation and ingenuity (Defries, 2014), it contends that technology sets humans apart from other species. It seeks to work within current social and economic frameworks, being honest about the trade-offs. Like the Smart Growth Reformer story, the Ecomodernist approach encourages investment in new energy technologies, but states that long-term government investment is vital and benefits should be shared fairly (Nordhaus and Shellenberger, 2015).

The Ecomodernist story considers that multiple framings are required to tackle climate change. One framing is climate change as an opportunity for governments to invest in energy innovations including natural gas and nuclear energy, with stop-gap measures to reduce carbon dioxide levels such as carbon capture and storage (Victor, 2011; Arias-Maldonado, 2013; Symons and Karlsson, 2015). Through frames such as building societal resilience, alleviating poverty and improving energy equity, it seeks to be relentlessly pragmatic politically and represent climate change as a question of human dignity and moral leadership (Prins et al., 2010). It contends that climate change is an opportunity to spare nature and re-wild the Earth through urbanisation, more intensive agriculture and novel ecosystems (Nordhaus and Shellenberger, 2015). 'Green rationalism' informs the stance on nature, which is considered more resilient than fragile (Nisbet, 2014; Dryzek, 2013; Thomas, 2017). It holds that "pristine nature" (Marris, 2011:2) and wilderness (Latour, 2015) no longer exist. Metaphorical phrases present in the Ecomodernist story focus on reassurances that human ingenuity can manage technological progress to maximise well-being at the same time as minimising waste, thereby benefiting both humanity and the planet (Dryzek. 2013:177). Metaphors such as "Nature unused is nature spared" (Nordhaus and Shellenberger, 2015:19), and those that embrace technological advances like "Love your Monsters" (Latour, 2012:1) are used. The Ecomodernist story is one of benefitting from locationally decoupling human development from nature (Brand, 2010). It argues that renewables cannot supply the energy demands of modernisation and views sub-urbanisation and low-yield farming negatively.

Self-identified as pragmatists, those that promote the Ecomodernist story – "Ecomodernists" – are driven by empiricism, underpinned with a philosophy of universal human dignity, rather than a singular ideology (Brook, 2015). They are convinced that climate change is real and needs to be tackled. They do not agree with the Ecoactivist ideology of 'Limits to Growth' and instead argue that the demand for material goods will reach saturation levels as societies grow wealthier and that human impact on the environment could peak and decline this century (Goodall, 2011, 2014). Ecomodernists downplay people's desire for a rural existence or small-scale holdings defining it as un-modern (Caradonna et al., 2015). They believe that 'wilderness' enhances well-being and is important for aesthetic and spiritual reasons.

Prominent Ecomodernists evident in UK public media include Mark Lynas, environmental writer, academic Steve Fuller, Ted Nordhaus and Michael Shellenberger (co-founders of The Breakthrough Institute, an environmental research institute) and environmentalist Stuart Brand. The Ecomodernist climate change story is outlined in Table 5 along with assigned codes.

5.1.5. Overlapping themes

The analysis of the four main climate change stories, in which each was assigned 13 or 14 distinct codes, revealed some overlapping elements. Five themes were found to be present in at least three out of four of the climate change stories (Table 6). The two closest stories were the Smart Growth Reformer and the Ecomodernist with 5 out of 14 themes in common, a 35% overlap.

5.2. Appearance of the four climate change stories in UK National print media

5.2.1. The Lukewarmer story in the UK national print media

The Lukewarmer climate change story dominated editorials in The Daily Telegraph and The Daily Mail in 2001, 2007 and 2015. In The Times, it appeared in 89% of all editorials in 2001 but appeared in just under a third in 2015 (Fig. 3).

The uncertainties in the science of global warming (LWF2) have been a constant refrain in The Daily Telegraph and The Daily Mail over the three years analysed and, appeared in at least half of their editorials in 2015.

> "The more they juggle their theories to fit the inconvenient truths, the more the public will question whether these prophesies of global doom are based on genuine science, or guesswork" (*The Daily Mail*, 22 July 2015).

In mid-2007, the Lukewarmer story was marginalised by The Times when it accepted the scientific reality of climate change, although it

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Table 5
Ecolinguistic analysis of Ecomodernist climate change story with assigned codes.

Ecolinguistic Framework	Description	Code
Stories-we-live-by	Technology and modernisation are the foundations of human progress. Moral, progressive, optimistic and pragmatic story of how technological innovations accelerated by government investment can mitigate climate change issues at the same time as reducing poverty and sparing nature	
Ideology	Progressive, humanist and anthropocentric. Humans are special: they have great potential for innovation and ingenuity and have both rights and responsibilities to the non-human world	EMIH
	Technophiles. Technology sets humans apart from other species. Innovative solutions will bring modern living standards to people worldwide	EMIT
	Pragmatic. Work within current economic and social frameworks. Strong role for long-term government investment, collective action and sharing benefits fairly	EMIP
Framing	Climate change is an opportunity for governments to invest in innovative energy technologies	EMF1
	Climate change is an opportunity to build societal resilience and alleviate global poverty. It is a question of human dignity.	EMF2
	Climate change is an opportunity to spare nature and re-wild the Earth by decoupling human actives from nature	EMF3
Metaphor	Nature unused is nature spared; love your monsters	EMM
Evaluation	Good: Decoupling from nature by intensifying human activities. Technology and energy innovation. Re-wilding and re-greening the earth	EMEG
	Bad: Sub-urbanisation, low yield farming. Renewables cannot supply enough energy to modern society	EMEB
Identity	Pragmatists with a philosophy of universal human dignity	
Conviction	Climate change is real and needs to be tackled. There are serious threats to human well-being	EMC1
	Perpetual human population and economic growth is uncertain. Demand for material goods is reaching saturation levels. Human impact on the environment could peak and decline this century	EMC2
	Long-term government investment is vital. Need to focus on understanding how technological advances happen	EMC3
Erasure	Downplays people's desire for a rural existence, small-scale farming, and simple life	EME
Salience	Wild nature is worthy of attention for aesthetic and spiritual reasons and enhances well-being	EMS

continues to highlight the lack of scientific consensus in relation to extreme weather events:

> "Scientists are divided over whether the profusion of extreme weather that has hit Britain over the past few years is a product of climate change or natural variation" (*The Times*, 8 December 2015).

The futility of mitigation and international treaties (LWF3) has maintained visibility in The Daily Telegraph and The Daily Mail:

> "Even if the Kyoto proposals were rigorously adhered to, they would not affect the globe's temperature by more than a fraction of one degree over the next 50 years" (*The Daily Telegraph*, 30 March 2001).
> "What a waste of energy to promote the saving of energy" (Daily Mail, 2015 December 14th).

The need to invest in adaptation to climate change (LWF3) gained salience across the media in 2007 and 2015. This accounts for the occasional appearance of the Lukewarmer story in The Guardian and The Independent:

> "Half will be spent on mitigation against the effects of climate change - flood defences for instance - while the rest will go towards so-called "adaption schemes", including solar energy. These commitments are laudable" (*The Independent*, 1 December 2015).

One of the central Lukewarmer ideologies of individuals not having limitations placed on their consumption or lifestyle choices, (LWIA) appeared in force in The Times, The Daily Telegraph and The Mail in 2007:

> "The car and plane allow us to travel where and when we want, with few restrictions beyond what we can afford. That is a way of life we are not willingly going to surrender" (*The Daily Mail*, 12 March 2007).
> "While some green groups hope that allocating individual quotas could help to show people how far they are living beyond planetary means, this could never be workable in practice" (*The Times*, 14 March 2007).
> "Mass air travel is not "binge flying". It is the everyday miracle of our age" (*The Times,* 14 August 2007).

The acknowledgment that life for humanity is improving (LWS) has appeared in relation to better air quality (*The Daily Mail*, 26 April 2007) and cleaner rivers (*The Independent*, 6 November 2001).

Religious metaphors are used in the Lukewarmer climate change story to denigrate the position that climate change is a planetary emergency (Table 7).

5.2.2. The ecoactivist story in the UK national print media

The climate change story offered by Ecoactivists dominated the 2001 editorials in The Guardian (100%) and The Independent (73%). In 2015 its' prominence in these two titles had dropped to 65% and 40% (Fig. 4). In contrast, Ecoactivist elements did not feature at all in The Daily Telegraph, The Times or The Daily Mail in 2001. In 2015 it appeared in half of The Times editorials and a third of The Daily Telegraph editorials.

Of the Ecoactivist frames, the 'imminent catastrophe' framing (EAF1) was used the most, followed by 'limits on consumption and lifestyle' (EAF2). 'Deprioritising economic growth" (EAF3) only appeared in The Guardian in 2015. The 'imminent catastrophe' framing appeared in The Guardian, The Independent and, in 2015 The Times. It was most prevalent in The Guardian, being used in about 40% of all editorials for each year, albeit with a change of emphasis. In 2001 the threats posed by climate change were "desertification doubling, increased flooding, soil erosion" (*The Guardian*, 9 March 2001). In 2015 these threats were those of war and conflict:

> "Unchecked climate change ... could have catastrophic consequences - a rise in global temperatures ... leading in turn to rising

Table 6
Thematic overlap between climate change stories, with assigned codes (cf. Appendix A).

Theme	Ecoactivist	Smart Growth Reformer	Ecomodernist	Lukewarmer
Climate change is real; a response is needed	EAC1	SGC1	EMC1	Do not agree
Economic growth is important	Do not agree	SGIE	EMIP	LWC3
Renewables are not enough	Do not agree	SGEB	EMEB	LWEB
International agreement is necessary	EAEG	SGEG	EMEG	Do not agree
Nuclear power is necessary	Do not agree	SGC3	EMF1	LWC2

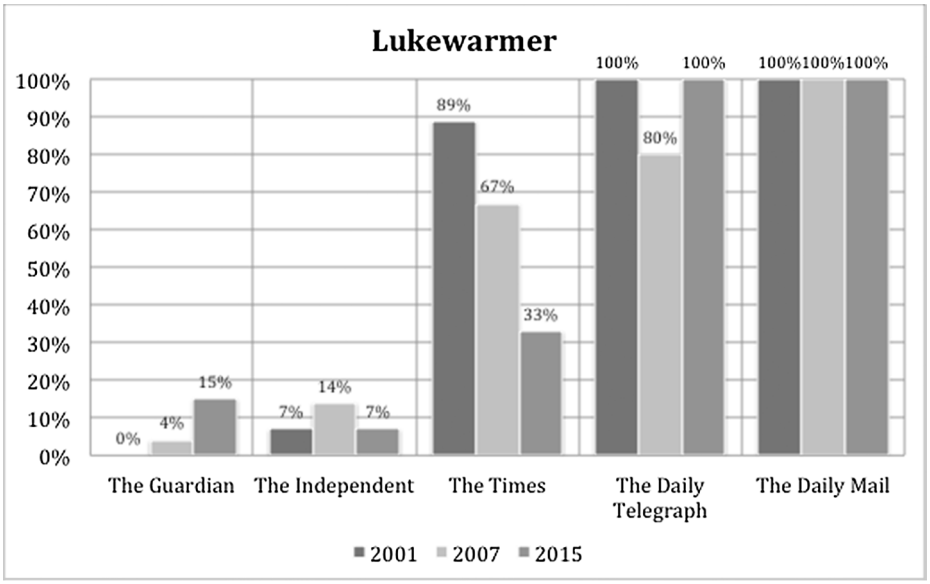

Fig. 3. Percentage of 'climate change' editorials within each title, and within each year, which contain significant elements of the Lukewarmer story (cf. Table 2).

sea levels and huge movements of people fuelling conflict and instability" (*The Guardian*, 18 November 2015).

Over a third of The Independent editorials used this framing in 2007, with an emphasis on near-term horizons:

"Rising sea levels, higher temperatures, drought … will make much of the planet uninhabitable within the lifetime of our children" (*The Independent,* 1 January 2007).

The 'imminent catastrophe' framing surfaced in The Times for the first time in 2015 appearing in a third of editorials, with an emphasis on safety and food security:

"It is not alarmist to predict food shortages and price inflation within the next half century if we fail to change what we eat" (*The Times*, 28 January 2015).

The second Ecoactivist framing of 'limits on consumption and lifestyles choices' (EAF2), was employed by The Guardian and The Independent and appeared in all three years analysed. In 2007, this framing appeared frequently in The Times focussed on individual behaviour and "reducing one's own carbon emissions" (*The Times*, 19 January 2015). The need for governments to invest in renewable energy has been championed by editorials in The Guardian and The Independent in 2001, 2007 and 2015. In 2015 nearly half highlighted the potential of green energy technologies. The Times adopted a more positive attitude towards renewable sources in 2015 (*The Times*, 7 April 2015) as did The Telegraph, although both on a more sceptical basis and "not at any price" (*The Telegraph*, 4 August 2015).

The third Ecoactivist framing of 'deprioritising economic growth and finding alternative economic models' was a marginal framing, appearing only twice in The Guardian in 2015. On nuclear power generation, the Ecoactivist conviction that it is too risky and too expensive (EAC2) was prominent in The Independent and The Guardian in 2001 and 2007 where it was described either as "hopelessly uneconomic" (*The Guardian*, 19 May 2001) or as dangerous: "The risk to life is too high" (*The Independent*, 26 June 2001). In 2015, there appears to have been a change in attitudes towards nuclear power and this conviction was not visible. Metaphors connected with the Ecoactivist climate change story often focused on war and apocalyptic visions (see Table 8).

5.2.3. *The Smart Growth Reformer story in the UK national print media*

The Smart Growth Reformer framing of 'climate change as an economic problem and a threat to the global economy' (SGF1) was a leading story in 2007 across the national media. It was the predominant story in The Times in 2007, with 58% of editorials focussed on both the economic threats of climate change and potential business opportunities. The influence of Smart Growth Reformer ideas appeared in two-thirds of the editorials in The Telegraph in 2015 (Fig. 5). Its visibility in The Guardian and The Independent was much less in 2015, compared to 2007.

Of the three main frames used by Smart Growth Reformers, the framing of climate change as an economic problem was the most prevalent in 2007 appearing in around 40% of editorials in The Guardian, The Independent and The Times. The Guardian and The Independent were early supporters of the carbon tax, as indicated by the following example from The Independent:

"The case for a carbon tax, which penalises the polluter in a much more neutral fashion than the present mish-mash of duties and levies, would go a long way towards that objective," (*The Independent*, 26 June 2001).

In 2007, there was an increase in support for carbon trading, taxation and emissions quotas, with The Telegraph and The Times

Table 7
Examples of some metaphors used in 'Lukewarmer editorials'.

Metaphor	Reference
The prophets of Armageddon should cool down	*The Daily Telegraph*, 30 March 2001
Hysterical righteousness will find none	*The Times*, 30 March 2001
… a near-apocalyptic vision of the dangers posed by global warming	*The Daily Telegraph*, 4 May 2007
… zealots, to ask … is regarded as some sort of heresy	*The Times*, 7 April 2007
With the zeal of an election season convert	*The Daily Mail*, 26 April 2007
Climate change evangelists	*The Times*, 13 July 2007

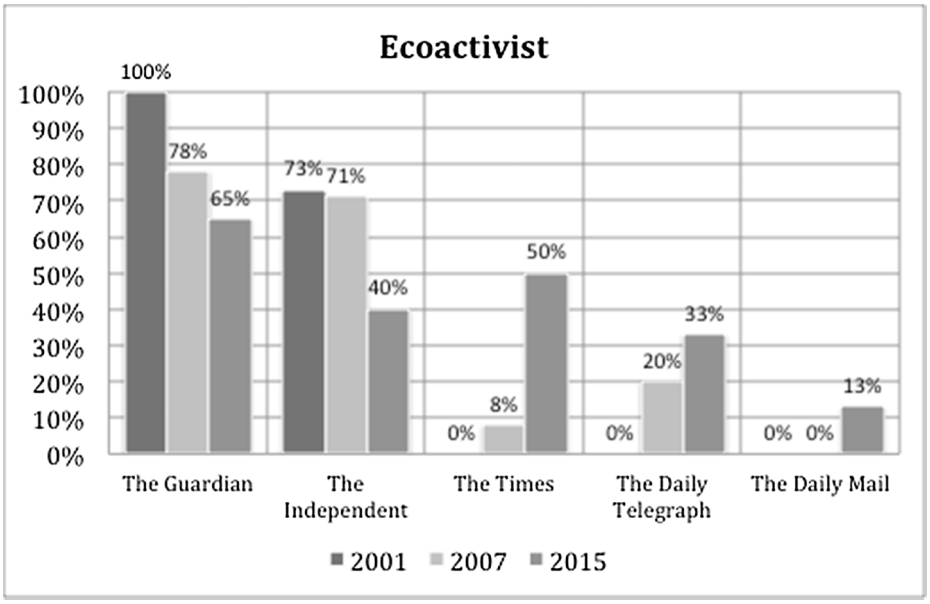

Fig. 4. Percentage of 'climate change' editorials within each title, and within each year, which contain significant elements of the Ecoactivist story (cf. Table 3).

Table 8
Examples of some metaphors used in 'Ecoactivist editorials'.

Metaphor	Reference
'Taliban-style act of wanton destruction'	*The Guardian*, 4 March 2001
'Instead of a shining city on a hill, the world sees a dark smokestack belching fumes'	
'The omens, to put it mildly, are not good'	*The Independent,* 11 July 2001
'as the planet climatically burns'	
'mankind's final warning'	*The Independent,* 3 February 2007
'combat climate change'	*The Times*, 8 June 2007
'there is no planet B'	*The Guardian*, 28 November 2015

concentrating on emissions trading:

> "The best solution would be for realistic targets to be set by governments, which would then leave companies to trade in carbon emissions as they thought fit" (*The Daily Telegraph*, 1 June 2007).

The Guardian, The Independent, and the Daily Mail promoted taxation:

> "Green taxes are not the only way to tackle climate change, but they are a key instrument" (*The Guardian*, 29 September 2007)
> "The 'green air miles' tax on flights proposed by Shadow Chancellor George Osborne has some attractions" (*The Daily Mail,* 12 March 2007).

Climate change as a business opportunity (SGF3) was advocated in The Times and The Telegraph in 2007. It emerged in The Guardian and The Independent in 2015:

> "For the green movement to draw in more of the wider population, the emphasis on cataclysm - while entirely necessary - must be matched with promoting the vision of a green economy, with new jobs and new opportunities" *(The Independent*, 17 September 2015).

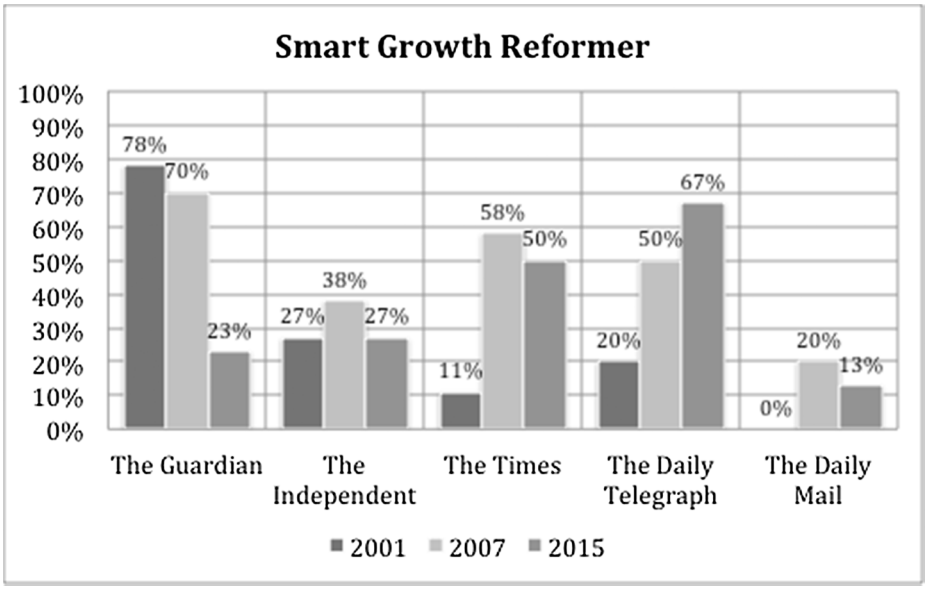

Fig. 5. Percentage of 'climate change' editorials within each title, and within each year, which contain significant elements of the Smart Growth Reformer story (cf. Table 4).

Table 9
Examples of some metaphors used in 'Smart Growth Reformer editorials'

Metaphor	Reference
Green industrial revolution	*The Guardian*, 9 March 2001
Clean energy	*The Times*, 17 May 2001: *The Telegraph*, 7 June 2007: *The Independent*, 15 July 2015
Green taxes	*The Independent*, 3 October 2015
Greening the economy	*The Times*, 14 December 2015 *The Guardian* 29 November 2015
Green economy	*The Times*, 14 December 2015

Metaphors associated with Smart Growth Reformers often related to energy technology and the economy (Table 9).

5.2.4. The Ecomodernist story in the UK national print media

The Ecomodernist climate change story was more present in the national media in 2015 compared with 2001 (Fig. 6). In 2015, it was the dominant story in The Times (83%) and The Independent (53%), and was a close second in The Guardian, appearing in 58% of editorials compared with the Ecoactivist climate change story, which surfaced in 65% (cf. Appendix B).

One of the central ideologies of Ecomodernism is an optimism in human potential for technological innovation. These ideas were embraced in 2007 in The Times, The Guardian, The Independent and The Daily Telegraph, but became more ubiquitous in 2015. Two examples were:

> "Human ingenuity has accelerated global warming as a by-product of the industrial revolution. Only human ingenuity can slow it down." (*The Times*, 28 November 2015).
> "It is on these technologies, together with carbon capture and storage, that the UK's low-carbon future depends - and, along with it, the chance to lead technological development" (*The Guardian*, 25 October 2015).

One of the main technological fixes that obtained widespread support in The Guardian and The Independent in 2015 was 'carbon capture and storage' and Government moves to remove funding was widely condemned:

> "MPs on the select committee's panel was [sic] caustic about the Chancellor's decision to scrap £1bn of funding for carbon capture and storage technology, which removes CO_2 from the atmosphere" (The Independent, December 16 2015).

A new level of pragmatism, moral responsibility and consideration of the poor (EMIP, EMF2) was detectable in editorials across The Guardian, The Times, The Daily Telegraph and The Independent in 2015.

> "We need to work in step with other countries for a low carbon future. That means showing hard-headed pragmatism, not racing ahead of the rest for political reasons," (*The Daily Telegraph*, 14 December 2015).
> "But climate change is above all a matter of equity - equity between rich world and poor world, equity between generations. A deal in Paris demands moral leadership," (*The Guardian*, 1 January 2015).

The overriding need for government investment, which was the preserve of The Guardian and The Independent in 2001 and 2007, acquired cross-paper support by 2015, especially in The Times:

> "It should transfer those [renewable energy] subsidies to R&D on the scale of the Manhattan Project in energy storage, advanced solar power and the holy grail of applied physics - controlled nuclear fusion" (*The Times*, 28 November 2015).
> "What is needed is a new burst of investment, research and development to make eco-friendlier energy sources profitable too. Where the money comes from government, it must be carefully targeted and geared for return" (*The Times*, 14 December 2015).

The Ecomodernist evaluation of decoupling human development from nature and intensifying agriculture (EMEG) were not major themes in the editorials analysed, but the concepts did surface for the first time in 2015 in The Times and The Guardian:

> "Are we witnessing a new trend, where growth decouples from coal consumption?" (*The Guardian*, 27 January 2015.
> "Rising crop yields and better science will undoubtedly help with food supply" (*The Times*, 28 January 2015).

The Ecomodernist metaphors and rhetorical devices predominantly emphasised technological solutions to environmental problems. These manifested as reassurance, connection to progress and pragmatism, and increased in prevalence over the period analysed (see Table 10).

5.2.5. Overlapping themes in the UK national print media

In this section we refer back to the five overlapping themes between the four stories identified earlier (Table 6) and comment on the changing relative positions of the different newspaper titles with respect to them as revealed by our corpus of editorials.

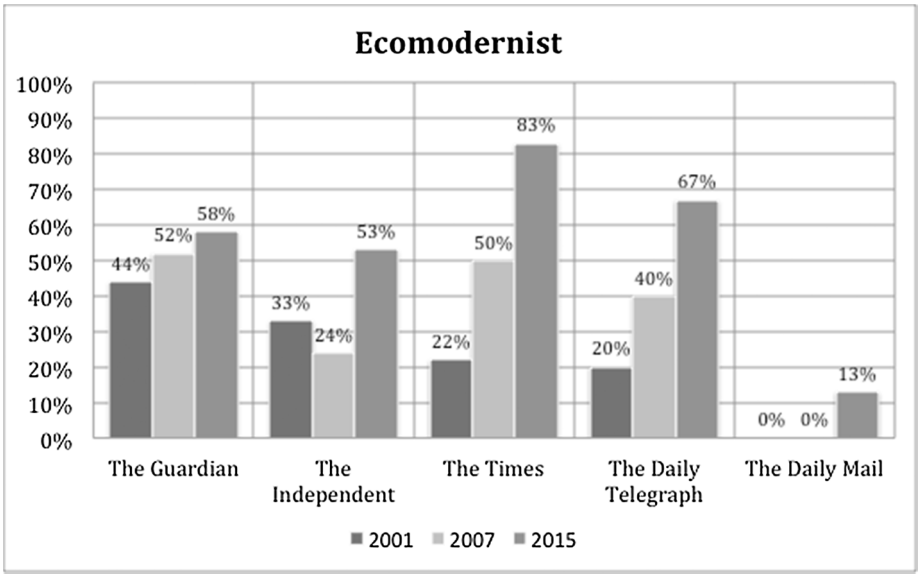

Fig. 6. Percentage of 'climate change' editorials within each title, and within each year, which contain significant elements of the Ecomodernist story (cf. Table 5).

Table 10
Examples of some metaphors used in 'Ecomodernist editorials'.

Metaphor	Reference
"Faith in technology.."	*The Times*, June 16, 2001
"Nature…has remarkable powers of self-recovery"	*The Independent*, January 23 2001
"clean technology"	*The Guardian*, December 15, 2007
"When dealing with climate change, no man is an island"	*The Daily Telegraph*, June 1, 2007
"low carbon future.. means…hard-headed pragmatism"	*The Telegraph*, December 14, 2015
"advanced solar and nuclear technology …invest in and profit from cleaner energy."	*The Times*, December 14, 2015

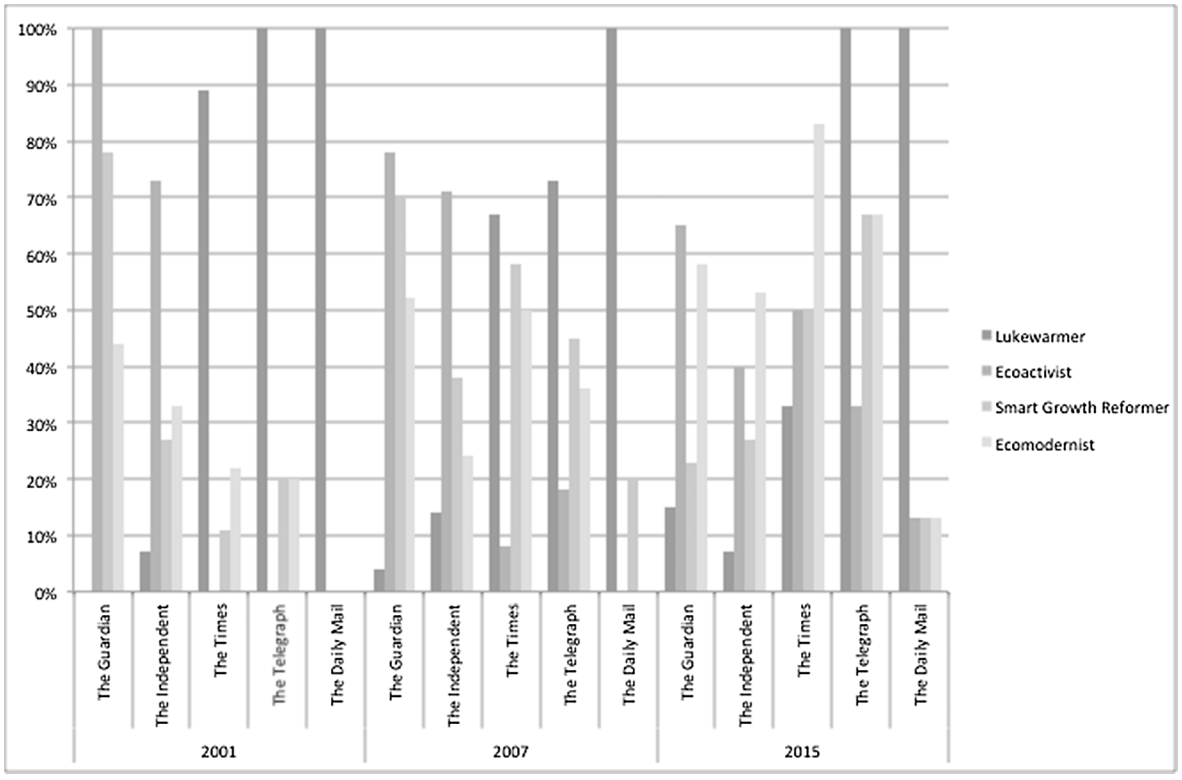

Fig. 7. Percentage of 'climate change' editorials within each newspaper title, and within each year, which contain significant elements of the four climate change stories (cf. Appendix B).

Ecoactivist, Ecomodernist and Smart Growth Reformer stories all take anthropogenic climate change to be a real phenomenon and one that demands a response. Our analysis would suggest that this has been a prevailing position for The Guardian and The Independent editorials in all three years analysed. The Times and the Daily Telegraph accepted this stance in, respectively, 2007 and 2015, but it would seem that the Daily Mail is as yet unconvinced that anthropogenic climate change is real and is happening.

The need for an international agreement is another area of accord between the Ecoactivist, Ecomodernist and Smart Growth Reformer stories. The drive for a global treaty to curb carbon dioxide emissions was a main feature in editorials in The Guardian and The Independent in 2001, 2007 and 2015. The need for an international agreement was acknowledged in The Times and The Daily Telegraph editorials, in 2007 and 2015, and by The Daily Mail in 2015, although with some scepticism of governments' ability to enforce it. This can be demonstrated by the editorials published after the COP21 Paris Agreement (2015):

> "President Obama said that this agreement is 'the best chance we have to save the one planet we have'. The real achievement will be taking it" (*The Times*, 14 December 2015).

The ability of renewables to supply all our energy needs is questioned by the Smart Growth Reformer, Ecomodernist and Lukewarmer story. This sceptical rhetoric towards renewables was dominant in 2001, 2007 and 2015 in The Telegraph, The Times and The Daily Mail, who all present a critical view of renewable energy sources, with windpower, a particular target:

> "The Paris conference could make history by telling the truth about biofuels and wind power, which waste subsidies and will never meet soaring energy demands" (*The Times*, 14 December 2015)

As a consequence of this position these three stories contend that nuclear power needs to be part of the energy supply if society is to have a chance in reducing carbon emissions, sustaining current lifestyles and meeting future energy demands. In 2001, The Times and The Telegraph advocated nuclear power as "the cleanest form of mass energy generation" (*The Times*, 17 May 2001) and the "only plausible alternative" (*The Telegraph,* 20 April 2001). The Guardian, and The Independent rejected this position in 2001 and 2007. In 2015, however, the Guardian called it "the least bad option" (*The Guardian*, 22 September 2015) and The Independent re-branded nuclear power as a renewable energy source alongside wind and solar power (*The Independent*, 26 September 2015). The Daily Mail also, in 2015, stated that "a new generation of nuclear power stations" is the way forward (*The Daily Mail*, 14 December 2015).

The importance of economic growth is accepted by the Smart

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Growth Reformer, Ecomodernist and Lukewarmer climate change story, although for different reasons. In the Smart Growth Reformer story, it is a question of maintaining current lifestyles and enabling business opportunities through sustainable development; in the Ecomodernist story it is a conduit for sharing the benefits of modernity for people's well-being worldwide; and in the Lukewarmer story prosperity is the key to dealing with global warming. This theme was ubiquitous across all five newspaper titles.

As can be seen from Fig. 7 many editorials received more than one overall coding. An editorial receiving more than one code was normally because it contained a cross-narrative theme (c.f. Fig. 6) rather than non-related ideas from different climate change stories. This negated the need to assign weight to individual codes.

6. Conclusion

This study has identified four climate change stories that have had an influential role in the UK national conversation on climate change, as revealed through newspaper editorials. We have characterised these climate change stories using a multi-faceted ecolinguistic framework. Although the four stories offer contrasting visions and often conflicting views on the actions required in response to climate change, the analysis also revealed some areas of agreement (Table 6). Focusing on these common themes might be constructive for thinking of ways forward for climate change rhetoric and policy.

Our analysis also revealed how these stories have been constructed linguistically and how their presence has changed in newspaper editorials between the years 2001, 2007 and 2015 (Fig. 7). In 2001, when the Third Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) was published, these UK newspaper editorials revealed a strong partisan divide in the story of climate change that was being told. The Independent and The Guardian told a predominantly Ecoactivist story while those on the right-of-centre, The Times, The Telegraph and The Daily Mail, strongly held the Lukewarmer position of negating climate change as a planetary emergency.

In 2007, following the publication of the Stern Review (2006), which stated that early action on climate change would far outweigh the costs of not acting, the Smart Growth Reformer story of carbon taxation, quotas and emissions trading was widely adopted across the four broadsheet editorials (Appendix B). In the run-up to the UK Climate Change Act (2008) being passed into law, the Smart Growth Reformer story became the dominant narrative in The Times, (58%). The Times, also appeared to change its stance on the scientific reality of climate change because "the planet deserves the benefit of the doubt" (*The Times*, March 14th, April 7th, July 13 and July 25, 2007). In 2007 there was also a slight weakening of the partisan divide as certain aspects of the Lukewarmer position concerning adaptation appeared in The Guardian's and The Independent's editorials.

In 2015, the year that ended with United Nations Climate Change Conference (COP 21) in Paris, the Ecomodernist story had spread across the spectrum of 'broadsheet' newspapers. In 2015, aspects of the Ecomodernist argument were employed in over half of all the broadsheet editorials analysed: The Guardian (58%), The Independent (53%), The Times (83%), and The Daily Telegraph (67%). In contrast, the Ecoactivist position, which dominated The Guardian and The Independent in 2001 was less prominent in 2015, since these titles have increasingly incorporated a broader spectrum of climate change stories. Conversely, Ecoactivist arguments became *more* visible in traditional right-of-centre papers: in 2015, they appeared in half and two thirds of the editorials in The Times editorials and The Daily Telegraph respectively. The Smart Growth Reformer position was a strong influence in 2015 in The Daily Telegraph (67%). It was, however, a minor presence in The Guardian (23%) and The Independent (27%). Finally, the Lukewarmer position was a minor influence in The Times, but was dominant throughout in The Daily Telegraph and The Daily Mail.

The analysis has revealed that the prevalence of the Ecomodernist climate change story is linked to: the need for government investment in low-carbon energy technologies, including natural gas and nuclear energy; an optimism in human potential for technological innovation; and a move towards pragmatism and moral responsibility. In 2015, the deployment of the Ecomodernist framing of climate change as an opportunity for investment in low-carbon energy sources has likely been influenced by a number of external factors. These include the 'power gap' the UK is facing in the 2020 s as coal-fired power stations reach the end of their life (Hughes, 2015) and the implementation of the UK's decarbonisation strategy to meet its greenhouse gas emissions reduction commitments under the Climate Change Act 2008 (Keay, 2016). In addition, the increasingly pragmatic focus on the UK's energy supply requirements and the government's commitment to building new nuclear power stations (DTI, 2007) has probably played a part in the salience of the Ecomodernist position that nuclear power is necessary to meet future energy demands. This stance on nuclear power, which is also taken by the Smart Growth Reformers and Lukewarmers, had by 2015 been accepted across all the newspapers analysed. This represents a step-change in attitude for The Guardian and The Independent towards nuclear power.

The prevalence in newspapers in 2015 of the Ecomodernist themes of moral responsibility and equity between rich and poor in relation to climate change, may have been influenced by Pope Francis's encyclical letter (2015). The Pope's letter highlighted the need to "resolve the tragic effects of environmental degradation on the lives of the world's poor", and increased public awareness of climate change as a moral issue (Maibach et al., 2015). Some scholars contend that humans have a deeply entrenched technological optimism, encouraging the view that technical solutions can be the primary remedy for environmental problems (Boykoff and Rajan, 2007; Brand and Fischer, 2012). Our analysis shows that the Ecomodernist and Smarth Growth Reformer faith in technology has been a persistence presence in the newspaper editorials, despite criticisms that this position is both naïve and dangerous (Meadows et al., 1972; Anderson, 2012a; Crist, 2018). Rapid technological advances in clean-energy technologies such as silicon photovoltaic solar modules, light-emitting diodes, land-based wind-power and electric vehicles, which are transforming the way UK energy is produced and used, have likely contributed to this persistent confidence in technology (Bassett et al., 2015; Grubb and Newbery, 2018).

Part of the Ecoactivist story that appeared in The Guardian and The Independent, in 2001, 2007 and 2015 and which appeared for the first time in The Times in 2015, is the 'imminent catastrophe' framing. This frame has developed from one of drought, flood and soil erosion in 2001 and 2007, to one in 2015 of conflict, instability and food shortages. Widespread media coverage of research asserting that drought caused by climate change contributed to the current conflict in Syria may have contributed to this change of emphasis (Gleick, 2014; Kelley et al., 2015), although such claims are contested (Selby et al., 2017).

Calls for investment in adaptation, which are part of the Lukewarmer story, spread across the media, in 2007 and 2015. Editorials promoting this idea appeared in 2007 following severe flooding across the UK after the wettest summer on record (BBC News, 2007) and in 2015 after Storm Eva and Storm Desmond resulted in the flooding of 16,000 homes (BBC News, 2016). Despite the scientific assertion that "it is very difficult to attribute an individual event to external forcing" (IPCC, 2012:128), there is an increased probability of more intense rainfall because of global warming. The weather-climate connection has particular cultural salience in Britain, with flooding episodes in the UK increasing the prominence of climate change in the media and strengthened calls for action to build resilience within the society (Gavin et al., 2011). Flooding has also fuelled pragmatism, as it is increasingly acknowledged: "that not every home can be defended" (*The Guardian*, 7 December 2015). Such 'visibility' of climate change bridges an uneasy alliance between lay understanding and scientific knowledge (Rudiak-Gould, 2013). There are dangers in claiming climate change is responsible for events like flooding, when responsibility also lies with poor government funding in

flood defences and farming practices which exacerbate rather than mitigate flooding (Carvalho, 2005).

Our analysis suggests that the once partisan divide on climate change between the centre-left broadsheet papers, The Guardian and The Independent, and the right-of-centre broadsheet papers, The Times and The Daily Telegraph is much less in 2015 than it was in 2001. In 2015, the editorials in these four broadsheets had repositioned to embrace ideas and narrative elements from across the ideological spectrum. The more nuanced portrayal of climate change in broadsheet editorials suggests a more complex understanding of the politics of climate change and indicates that at least some aspects of all four climate change stories are extending to different publics across the ideological spectrum. This finding does not extend to The Daily Mail.

We were also interested in evaluating the effectiveness of the ecolinguistic framework used in this study. Overall, the ecolinguistic framework–with its multi-faceted elements including ideologies, evaluations, convictions, framings, erasure and salience (Table 1) – enabled us to dissect systematically the four climate change stories identified. The framework also allowed us to identify areas of agreement between seemingly ideologically entrenched and politically distinct positions, as demonstrated by the overlapping cross-story themes (Table 6). It is also important to note some limitations however. One in particular was the difficulty of identifying the element of 'erasure' in the editorial texts. Although we highlighted some points of erasure in the different climate changes stories, it was a challenge to determine by inference what had been suppressed or excluded in the editorial texts analysed, unless it was explicitly stated that something was unimportant. Alternatively, one could approach erasure in a different way, not as elements missing from a specific story, but as the absence of attention to the issue of climate change itself.

For example, the number of editorials identified varied considerably across the five newspapers, from a total of 14 in The Daily Mail to 92 in The Independent (Fig. 2). Although the ecolinguistic analysis does not rely on the absolute number of editorials published (it is the structure and relative frequency of different stories that is our concern), nonetheless, the overall *number* of 'climate change' editorials published gives an indication of whether newspaper editors think climate change is a story worthy of consideration. A lack of editorials addressing climate change might therefore be interpreted as a form of erasure: a refusal to emphasise an editorial position on the issue or else an attempt to reduce its significance. Such erasure was most obvious in The Daily Mail in 2001, which published only one 'climate change' editorial that year, and in The Daily Telegraph in 2015, when only three such editorials were published. Although The Daily Telegraph adopted aspects of the Smart Growth Reformer and the Ecomodernist story, both these newspapers promote a predominantly Lukewarmer account which does not view climate change as a matter of pressing concern.

It is also worth asking whether the four climate change stories identified are the only ones, or at least are the dominant ones, that are part of the national conversation on climate change in the UK. There are, for example, some specific topics and policy proposals that do not easily fit within the narrative elements of these stories laid out in Tables 2–5. Two examples of such would be planetary geo-engineering projects such as solar radiation management (Royal Society, 2009) and forms of voluntary population control (McDougall, 2010). Neither of these interventions were proposed as areas for action in any of the editorials analysed here, although The Guardian did discuss how curbing population was not going to help the planet (*The Guardian*, 3 August 2015). Furthermore, the analysis of 173 editorials did not reveal any substantive framings or narrative elements that could not be accommodated within the scope of the four stories outlined in this research.

This study has focused on salient climate change stories appearing in UK newspapers. It would be interesting to do comparative studies on media representations of climate change stories in non-Anglophone parts of the world. Cross-cultural comparative studies are important because they can identify how different societies absorb and react to climate change in different ways (Schmidt et al., 2013; Painter and Ashe, 2012). They also have the potential to reveal different framings of the challenges of climate change. For example, an analysis of climate change discourse in Malaysian newspapers shows the importance of an environmental justice story, which focuses on the fair treatment of all people with regard to the implementation of environmental laws (Manzo and Padfield, 2016). This concern is partly captured by the Ecomodernist story of sharing benefits fairly, building societal resilience and alleviating poverty, but environmental justice did not appear directly in the editorial corpus analysed in our UK study. Any cross-cultural analysis would require the ecolinguistic approach applied in this study to be adapted to different cultural contexts to adequately capture the climate change stories within those societies.

The salient finding from this study is the (rather surprising) presence in 2015 of the Ecomodernist climate-change story across a broad spectrum of UK newspaper editorials. We suggest this is significant for a number of reasons. It highlights in these platforms of public opinion-shaping that partisan rhetoric about climate change – whilst maybe serving political goals - need not trump practical policy responses. Our analysis suggests that the editorial opinion expressed in these five newspapers has moved away from trying to 'solve' climate change through securing some decisive ideological supremacy in the war of words, a triumph that can only be illusory (Hulme, 2009), in favour of seeking more pragmatic responses. The analysis of editorials suggests the narrative appeal of such pragmatism has gained public salience.

Our analysis of the four climate change stories present in these editorials provides insights into how action on climate change can be encouraged through investment, modernisation and technological advance. This points to two areas for policy innovation that could be the focus for effective action on climate change and that are potentially less exposed to ideological contention, value differences and partisan hi-jack: investment in climate adaptation and in energy R&D (Prins et al., 2010). Pragmatic action to adapt to extreme weather events, such as flooding and heat-waves, could be an opportunity for building societal resilience with meeting the challenge of climate change acting as a supporting argument. Our analysis also suggests that a climate change story focused on energy innovation, with both private and government investment in energy demand management and low-carbon energy supply technologies, has widespread appeal across the political spectrum (Dirks et al., 2014). Such policy developments might not only build societal resilience, help reduce carbon emissions and improve air quality, but would be capable of maintaining quality of life, promoting business opportunities and spreading modernisation and energy equity worldwide.

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Declaration of Interest

None.

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Appendix A

See Table A1.

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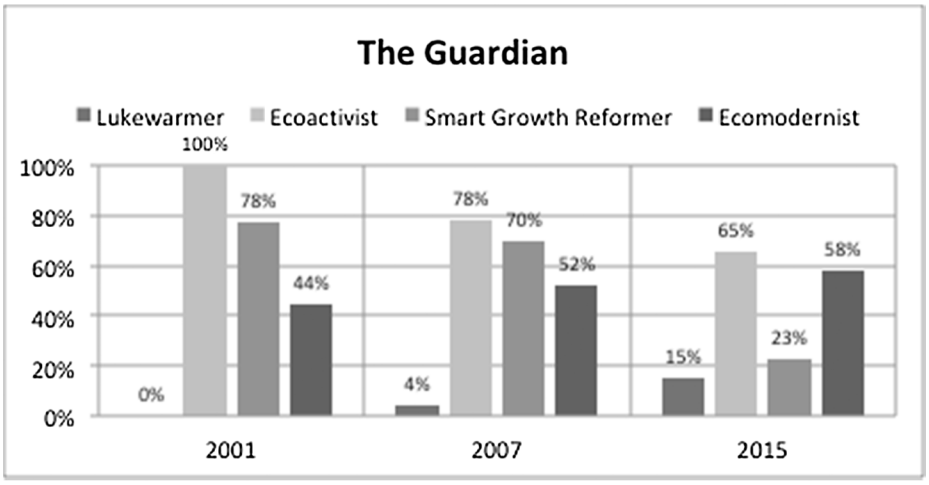
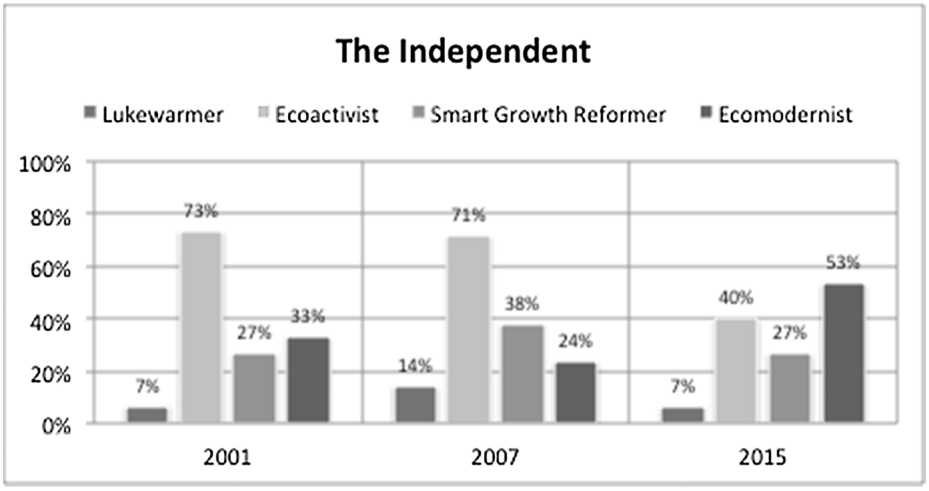
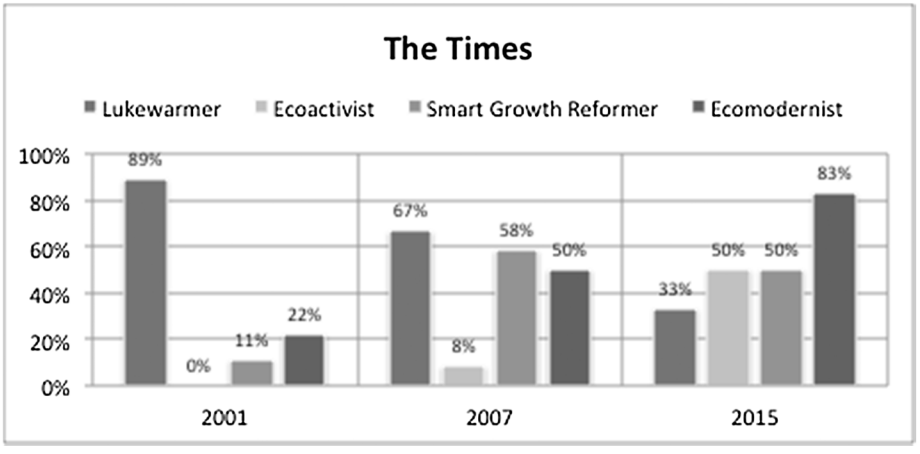
Table A1
Coding table.

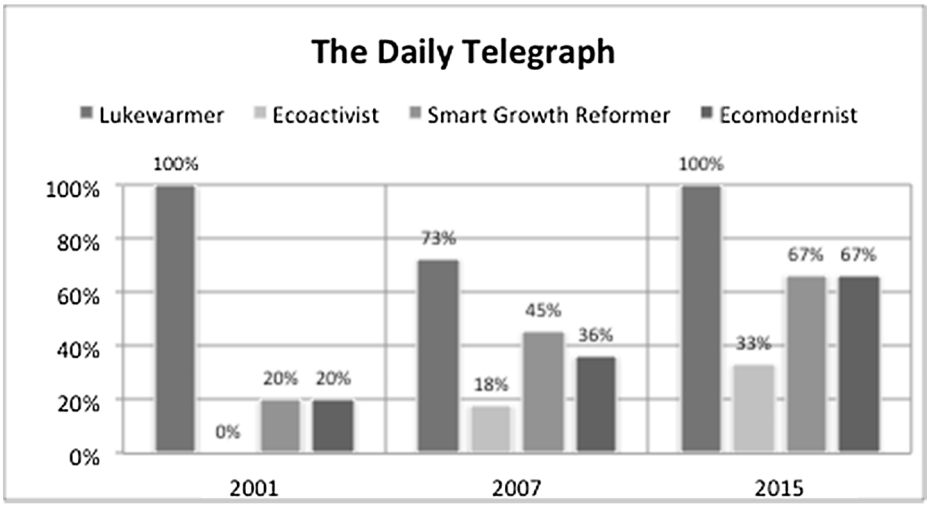
Story Form (cf. Table 1)	Lukewarmer	Ecoactivist	Smart Growth Reformer	Ecomodernist
Ideology	LWIS Climate change not dangerous	EAIC Humanity destroying the earth	SGIE Economic growth important	EMIH Human ingenuity EMIP Current frameworks
Ideology	LWIA Prosperity and adaptation not mitigation	EAIG Limits of economic growth	SGIN Nature as natural capital	EMIT Technology, innovative solutions
Framing (1)	LWF1 Increase CO_2 good for agriculture and nature	EAF1 Imminent catastrophe	SGF1 Economic problem threat to global economy	EMF1 Government investment in innovative energy technologies
Framing (2)	LWF2 science flawed, models exaggerated scientists ideologically motivated. No consensus.	EAF2 Limits on consumption, lifestyle choices, renewables good for economy	SGF2 Nature has value. Monetary value assigned to ecosystem services	EMF2 Build societal resilience and reduce poverty. Human dignity
Framing (3)	LWF3 Mitigation futile. International agreement pointless.	EAF3 Deprioritise economic growth, new models	SGF3 Business opportunity in low carbon economy, jobs	EMF3 Decouple from nature and re-wild earth
Metaphor	LWM religious: crusaders, zealots, evangelists	EAM – war, apocalyptic, embedded humanity	SGM green growth, clean energy revolution	EMM nature spared
Evaluation Good	LWEG	EAEG	SGEG	EMEG
	a. Global warming good	a. Reduce carbon footprint	a. Economics: carbon tax	a. Decouple from nature, intensify human activity
	b. Adaptation good	b. Renewables good	b. Sustainable growth	b. Energy technology innovation
	c. Local vs international agree	c. International agreement	c. International agreement	c. International agreement
Evaluation Bad	LWEB Renewables not enough	EAEB Nuclear power Industrialisation, technological fixes are bad,	SGEB Renewables not enough	EMEB Renewables not enough, low yield farming
Conviction (1)	LWC1 Climate change real no action	EACI Climate change real action required	SGC1 Climate change real action required	EMC1 Climate change real action required
Conviction (2)	LWC2 Investment in adaptation	EAC2 Nuclear energy and geo-engineering too risky and costly	SGC2 Continual economic growth possible and desirable	EMC2 Perpetual human population and economic growth uncertain
Conviction (3)	LWC3 Economic growth vital	EAC3 Economic growth false, breeds dissatisfaction	SGC3 Carbon neutral by 2050. Nuclear energy needed.	EMC3 Long-term government investment vital
Erasure	LWE Rising CO_2 not important. Not related to extreme weather.	EAE Aspirations for better life: flying, driving cars, energy	SGE Limits on natural resources	EME Rural existence/growth
Salience	LWS Life is improving	EAS Nature fragile	SGS Future generations	EMS Nature resilient

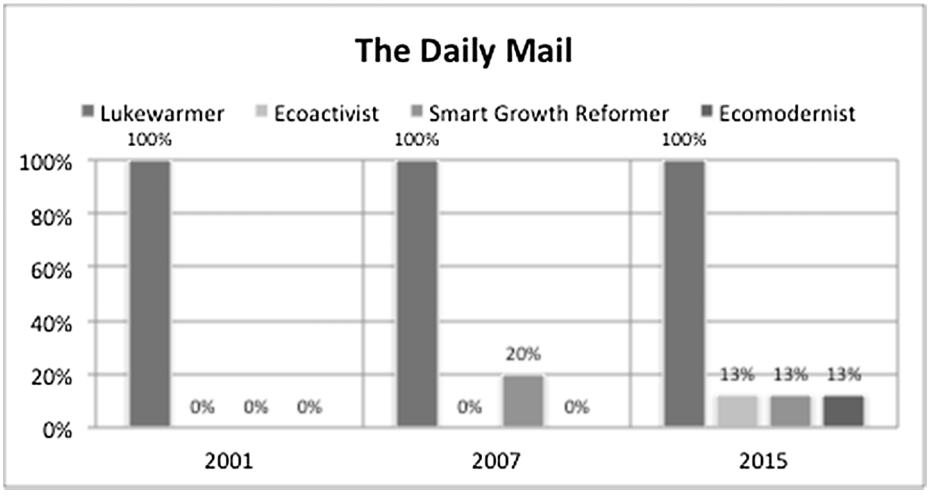
Appendix B:. Percentage of 'climate change' editorials within each title and within each year, which contain significant elements of the four climate change stories











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